

Policy Option Considerations (October 2019)

Science Advisory Board (SAB) responses to EPA's requests for the SAB's views on a biogenic assessment factor (BAF) in connection with EPA's 2011 and 2014 biogenic carbon accounting frameworks should not derail EPA from adopting a de minimis rule that recognizes that forest-derived biogenic CO₂ emissions are carbon neutral, given that forest carbon stocks are stable or increasing. Moreover, separate and independent from questions related to forest carbon stocks, biomass residuals and biowastes are carbon neutral. Accordingly, EPA should use its substantial discretion under the Clean Air Act to exclude from the PSD permitting program biogenic CO₂ emissions from the use of biomass as a fuel or feedstock.

In exercising that discretion, EPA is not required to rely on SAB's advice on a BAF for EPA's 2011/2014 accounting framework in order to take a different policy approach when applying PSD to CO₂ emissions resulting from biomass as a fuel or feedstock. SAB was not charged with making regulatory recommendations or interpreting the Clean Air Act – that is EPA's role. EPA may therefore exercise its judgment and set aside the advice of the SAB on the BAF approach, including by articulating why it has chosen an alternative approach for bioenergy. Indeed, since asking for SAB's advice, EPA has been charged by the Congress to develop a new policy, which EPA has said it will do.

There is ample evidence already before EPA on which to base an alternative approach, supported by numerous studies and by empirical results, founded *not* on the proposition that forest-derived bioenergy is *a priori* carbon neutral, but on the principle that it is carbon neutral because its use is not causing, and is not anticipated to cause, a decrease in forest carbon stocks. The fact is U.S. forest carbon stocks are and have been stable or rising for some time. And EPA will be able to confirm that its exemption of biogenic CO₂ from PSD BACT requirements is not adversely impacting the forests that we have in the United States by monitoring forest carbon stocks using the U.S. Forest Service's Forest Inventory and Analysis (FIA) database.

EPA regulation should not discourage use of forest biomass, but rather should remove barriers to its use by treating the biogenic CO₂ emissions that result as carbon neutral. Accordingly, EPA should treat forest-derived biogenic CO₂ emissions as carbon neutral, as forest carbon stocks are stable or increasing. If FIA data were ever to suggest that U.S. forest carbon stocks are no longer stable or increasing, EPA would need to determine whether using forest biomass as an energy source is causing or contributing to the conversion of forests to non-forest use. If so, EPA could then revisit the regulatory treatment of CO₂ emitted from the use of biomass as fuel.

In any case, there are sound reasons to reject any suggestion by the SAB that EPA should engage in complex, impractical and highly uncertain modeling to try to predict the future anticipated forest growth without bioenergy in order to address "additionality." Instead, EPA should rely on existing studies to conclude that wood demand in fact contributes to maintaining and increasing carbon stocks in the U.S. The EPA can easily monitor U.S. forest carbon stocks going forward to ensure that exempting biogenic CO₂ emissions from PSD permitting does not result in reduced forest carbon stocks by reviewing the available FIA data. Moreover, SAB's insistence

on complex and uncertain modeling is contradicted by expert views, including the widely accepted approach taken by the Intergovernmental Panel on Climate Change (IPCC) and the advice of experts from the SAB's Biogenic Carbon Emissions Panel (Panel), the U.S. Department of Agriculture (USDA), the U.S. Forest Service (USFS) and other organizations. Ultimately, the SAB's "additionality" concerns would be addressed, without relying on complex, uncertain modeling, by this carbon-stocks approach.

Under longstanding presidential orders and practice, executive agencies such as EPA have been directed not to regulate unless they demonstrate a "compelling public need," such as "the material failure of private markets."¹ Strong evidence in EPA's docket shows that U.S. forest fiber markets are robust and that landowners engage in anticipatory planting in response to expected future increases in fiber demand for all uses, including bioenergy. Accordingly, unless monitoring U.S. forest carbon stocks indicates that this market response has been significantly disrupted by the use of forest-derived bioenergy, such that forest carbon stocks are no longer stable or rising, biogenic CO₂ emissions from using forest biomass for fuel or feedstock should be treated as carbon neutral.

I. EPA may adopt its own policy determination and is not limited by statements made by SAB in fashioning that policy

- A. EPA is not legally required to incorporate any recommendations made through a voluntary peer review of the SAB or one of its subcommittees.
 - 1. Both of EPA's charges to the SAB for review of the 2011/2014 accounting framework specified that the Agency was not asking SAB "for regulatory recommendations or legal interpretation of the Clean Air Act statutes related to stationary sources."²
 - 2. The SAB also is not charged with setting EPA policy. SAB's charter states the Board's mission is to "provide independent advice and peer review to EPA's Administrator on the scientific and technical aspects of environmental issues ... [and] [t]he SAB will review scientific issues, provide independent scientific and technical advice on EPA's major programs, and perform special assignments as requested by Agency officials."³
 - 3. EPA's *Peer Review Handbook* states that the "[e]xcept where provided otherwise by law, peer review is not a formal part of, or

¹ See Executive Order 12866, Sec. 1.

² SAB Review of EPA's Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources (Sept. 2011) at A-2 (Sept. 28, 2012), *available at* [https://yosemite.epa.gov/sab/sabproduct.nsf/57B7A4F1987D7F7385257A87007977F6/\\$File/EPA-SAB-12-011-unsigned.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf).

³ SAB Charter, *available at* [https://yosemite.epa.gov/sab/sabproduct.nsf/Web/2017SABcharter/\\$File/SABCharterSept2017.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/Web/2017SABcharter/$File/SABCharterSept2017.pdf).

substitute for, notice-and-comment rulemaking or adjudicative procedures. The EPA's decision to conduct peer review in any particular case is wholly within the Agency's discretion. Similarly, nothing in the Peer Review Policy creates a legal requirement that EPA respond to peer review comments. To the extent that EPA decisions rely on scientific and technical work products that have been subjected to peer review, however, the remarks of peer reviewers should be included in the record for those decisions."⁴

- B. SAB has not provided definitive guidance that must be considered in evaluating whether to adopt a policy direction based on a carbon stocks approach.
1. SAB's 2019 report did not provide definitive conclusions. SAB lamented that EPA had not provided SAB a specific policy context for the Board to evaluate an assessment factor for an accounting approach, which the SAB said presented a significant limitation to the Board's work.
 - a) "The 2014 Framework lacks specificity and is written in a way that is too generic, with too many possibilities that would require assessment of different underlying science. Rather than offering a lengthy menu of calculation options, the EPA Framework needs to define its scenarios and justify those choices. This would enable the SAB to evaluate the science underpinning those decisions and justifications."⁵
 2. Further, the 2019 advice was the product of significant internal SAB disagreement. The Board did not follow the advice and rewrote the report of its own expert Biogenic Carbon Emissions Panel. That is a highly unusual if not unprecedented step by the Board that should give pause to reliance on any aspect of the Board's 2019 response.
 - a) For example, against the advice of some experts, including Panel members, representatives from the USDA, USFS and others, the SAB rejected the widely-accepted approach of the IPCC that is consistent with the carbon stocks principles – and did so with practically no analysis.
 3. Moreover, the charge given to the SAB in 2015 focused on an

⁴ EPA, Science and Technology Policy Council, *Peer Review Handbook* (rev. 2015), available at https://www.epa.gov/sites/production/files/2016-03/documents/epa_peer_review_handbook_4th_edition.pdf.

⁵ SAB Review of Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources (2014) at 4 (Mar. 5, 2019), available at [https://yosemite.epa.gov/sab/sabproduct.nsf/B86C81BACFAF9735852583B4005B3318/\\$File/EPA-SAB-19-002+.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/B86C81BACFAF9735852583B4005B3318/$File/EPA-SAB-19-002+.pdf).

evaluation of a “future anticipated baseline” modeling approach. 2015 Charge to SAB at A-3. It asked SAB for “Technical approaches, merits and challenges with applying a future anticipated baseline” and the “Scales of biomass use when applying future anticipated baseline approach.” 2015 Charge to SAB at A-6, A-7. If EPA now chooses not to follow that complex modeling / accounting approach, it need not address the technical response SAB provided.

4. SAB itself recognized EPA decisions regarding whether to exclude biogenic emissions from a regulatory framework is beyond the scope of SAB’s charges and expertise. Among other questions, EPA’s 2011 charge asked: “Does the SAB support the conclusion that the categorical approaches (inclusion and exclusion) [to biogenic emissions] are inappropriate ... based on the characteristics of the carbon cycle?” SAB answered that “[a] decision about a categorical inclusion or exclusion will likely involve many considerations that fall outside the SAB’s scientific purview, such as legality, feasibility, and possible, political will. The SAB cannot speak to the legal or full implementation difficulties that could accompany any policy on biogenic carbon emissions”⁶

C. EPA is also operating under a different legal framework than it was when it developed the 2011 and 2014 framework documents.

1. Since 2017 all congressional appropriations acts have required EPA to “establish clear and simple policies for the use of forest biomass as an energy solution, including policies that ... reflect the carbon-neutrality of forest bioenergy and recognize biomass as a renewable energy source, provided the use of forest biomass for energy production does not cause conversion of forests to non-forest use.”⁷
2. In an effort to comply with the law, EPA has issued its own internal policy on the carbon neutrality of biogenic emissions in April 2018, in which the previous Administrator stated that it is the current policy of the Agency “in forthcoming regulatory actions ... to treat biogenic CO₂ emissions resulting from the combustion of biomass from managed forests at stationary sources for energy production

⁶ SAB Review of EPA’s Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources at 3 (Sept. 2011).

⁷ See Pub. L. 115-31 § 428(2)(A) (2017); Pub. L. 115-141 § 431(2)(A) (2018); Pub. L. 166-6 § 428(2)(A) (2019). These provisions are law, to which EPA is subject. See, e.g., *Robertson v. Seattle Audubon Soc’y*, 503 U.S. 429, 437-40 (1992). As EPA’s Administrator has acknowledged, the direction provided by the Congress informs EPA’s actions on bioenergy, including consideration of the SAB advice.

as carbon neutral.”⁸ Administrator Wheeler reaffirmed that policy in the November 2018 joint letter submitted to the Congress by EPA, USDA and the Department of Energy.⁹

3. EPA in fact reiterated its obligation to these recent legislative and internal directives when the Agency responded to SAB’s March 2019 peer review report on the 2014 draft Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources:

“As EPA reviews the SAB’s final recommendations, we will consider them in light of the FY2018 Consolidation Appropriations Act, the agency’s April 2018 statement regarding the treatment of biogenic carbon dioxide emissions from the use of biomass from managed forests, as well as the November 2018 interagency letter to Congress from the EPA, the U.S. Department of Agriculture and the U.S. Department of Energy, which describes the agencies’ work to ensure consistent federal policy on biomass energy.”¹⁰

II. EPA should exclude biogenic CO₂ emissions from PSD permitting as carbon neutral based on the principle that unless use of biomass were to cause a decrease in terrestrial carbon stocks, biogenic CO₂ emissions do not contribute to GHG concentrations in the atmosphere when viewed over the appropriate time period and broad landscape scale.

- A. To implement the statutory directions provided by the Congress and policy advanced by the Administrator, EPA should adopt a different approach that focuses on the fact that U.S. forest carbon stocks are stable or increasing for the foreseeable future and that demand for biomass as a fuel or feedstock encourages maintenance and expansion of forest carbon stocks. EPA then can use U.S. Forest Service data to monitor forest carbon stocks in order to provide the necessary assurance that this approach is sound.
 1. If the data suggest that U.S. forest carbon stocks are not stable or increasing over broad temporal and spatial scales, that would trigger further review to assess whether using forest biomass as a renewable energy source is itself the cause of the conversion of

⁸ EPA, “EPA’s Treatment of Biogenic Carbon Dioxide (CO₂) Emissions from Stationary Sources that Use Forest Biomass for Energy Production” (Apr. 23, 2018), <https://www.epa.gov/air-and-radiation/epas-treatment-biogenic-carbon-dioxide-emissions-stationary-sources-use-forest>.

⁹ Letter from Andrew R. Wheeler, Administrator, EPA, Sonny Perdue, Secretary, USDA, and Rick Perry, Secretary, DOE to The Honorable Sen. Richard C. Shelby, The Honorable Sen. Patrick J. Leahy, The Honorable Rep. Rodney P. Frelinghuysen, and The Honorable Rep. Nita M. Lowey (Nov. 1, 2018).

¹⁰ Letter from Andrew R. Wheeler, Administrator, EPA, to Dr. Michael Honeycutt, Chair, SAB 7 (Apr. 19, 2019), [https://yosemite.epa.gov/sab/sabproduct.nsf/B86C81BACFAF9735852583B4005B3318/\\$File/EPA-SAB-19-002_Response.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/B86C81BACFAF9735852583B4005B3318/$File/EPA-SAB-19-002_Response.pdf).

forests to non-forest use, as opposed to other causes, such as development. The Forest Service's analysis to date suggests that urban and exurban land development, rather than the incremental use of forest biomass for energy, is expected to be the most likely cause of future forest conversion.

2. It is also essential to recognize that there is widespread consensus that manufacturing residuals and biowastes are inherently carbon neutral and in some cases result in net GHG reductions since their alternative fates are incineration without energy recovery or disposal in industrial landfills or lagoons which generates methane, a GHG that is 25 times more potent than CO₂. (See Section IV below.)
- B. This would be an alternative approach to the complex accounting frameworks that EPA had advanced previously – and thus distinct from the analysis EPA had asked the SAB to undertake.
1. As Panel member Roger Sedjo wrote in his dissent to the SAB's 2012 review of EPA's 2011 draft Framework, the carbon stocks approach is an "alternative approach[] for accounting for biogenic carbon."¹¹ It is consistent with the approach advocated by the IPCC "that would focus on the changes in aggregate land use and forests to determine whether, for example, aggregate forest stocks are expanding or contracting."
 2. As William Hohenstein, Director, Climate Change Program Office for the U.S. Department of Agriculture explained the "USDA prefers the IPCC accounting framework, which addresses biogenic feedstocks within the land sector....The IPCC approach would represent **a categorical exclusion under the Clean Air Act (CAA)** insofar as it excludes biogenic emissions from the energy sector; **the IPCC approach is not equivalent to an a priori assumption that these feedstocks are produced in a carbon neutral manner** or an assertion that land use activities contributing feedstocks to the energy sector can be managed without consideration of atmospheric outcomes."¹²
 3. Any concern over secondary or life-cycle emissions from production of forest biomass is misplaced. When forest biomass is harvested along with other products, these emissions would likely have taken

¹¹ Dissent of SAB Panel Member, Roger Sedjo, *cited in* Appendix E of the SAB's September 2012 Review of EPA's Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources (Sept. 2011) (Sept. 28, 2012).

¹² See Letter from William Hohenstein, Director, Climate Change Program Office, USDA, to Dr. Holly Stallworth, EPA Science Advisory Board (May 25, 2012).

place anyway. Furthermore, there are GHG emissions associated with extraction/production and transportation of alternative fuels as well, and those emissions are not considered in PSD permitting for a fuel-burning project.¹³ There are also few, if any, other GHG emissions associated with using manufacturing residuals or biowastes for fuel, because that biomass would have been harvested and transported regardless of its subsequent use as fuel.

C. There is ample data and support in the scientific literature for a carbon stocks approach. This extensive literature provides the foundation on which EPA may base a policy that exempts biogenic CO₂ emissions from PSD permitting, without getting mired in the details of a BAF analysis as part of a complex accounting framework.

1. In the U.S., forests are sustainably managed, with a 2016 net growth/removals ratio of 1.92.¹⁴
2. There is compelling evidence that U.S. forests will remain a net carbon sink for decades to come.¹⁵
3. Indeed, USDA research has concluded that the U.S. will have stable or rising forest carbon stocks well into the future.¹⁶
4. Under the USDA's reference case scenario, forest carbon sequestration will remain positive through 2060, although the rate of sequestration is likely to slow due mainly to forest aging.¹⁷
5. "Increased demand for wood can trigger investments that increase forest area and forest productivity and reduce carbon impacts associated with increased harvesting."¹⁸

¹³ See, e.g., 40 C.F.R. § 51.166(b)(4) (potential to emit does not include secondary emissions). (Although "secondary emissions are excluded from the potential emissions estimates used for applicability determinations," they are addressed in the air quality analyses if a PSD permit is required, but only if they are "specific, well-defined, quantifiable, and impact the same general area as the stationary source or modification undergoing review," [which is not the case for emissions associated with harvesting or extracting/producing fuels and transporting them to the site being permitted]. EPA, NSR Workshop Manual, Draft at A. 18 (Oct. 1990).

¹⁴ U.S. Forest Service, Forest Resources of the United States (2017), Table 36.

¹⁵ U.S. Department of Agriculture, "USDA Integrated Projections for Agriculture and Forest Sector Land Use, Land-Use Change, and GHG Emissions and Removals: 2015 to 2060" (Jan. 19, 2016), Reference Case Scenario, p. 16.

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ Reid A. Miner, Robert C. Abt, Jim L. Bowyer, Marilyn A. Buford, Robert W. Malmshiemer, Jay O'Laughlin, Elaine E. Oneil, Roger A. Sedjo, and Kenneth E. Skog, "Forest Carbon Accounting

- D. EPA can easily monitor U.S. forest carbon stocks going forward to ensure that the policy choice does not cause reduced forest carbon stocks.
1. Most importantly, EPA can use the U.S. Forest Service FIA database to monitor forest carbon stocks. That database, and the regular analysis of that data that is done by the Forest Service as required by federal law, provides a comprehensive, unbiased and readily available tool for EPA to use to evaluate forest carbon stocks.
 2. In the future, if EPA observes a decline of U.S. forest carbon stocks, it can evaluate that information and intervene as may be appropriate. See *supra* II.A.1.
 3. In contrast, as the SAB acknowledged, in its 2012 report, when asked by EPA whether the 2011 accounting framework was “simple to implement and understand?” the SAB responded: “[i]t is neither ... it is not intuitive to understand because it involves tracking emissions from the stationary source backwards to the land that provides the feedstock rather than tracking the disposition of carbon from the feedstock and land forwards to combustion and products. The *Framework* also appears to be difficult to implement, and possibly unworkable, especially due to the many kinds of data required to make calculations for individual facilities.”¹⁹
- E. Further, a broad spatial scale is appropriate – and more representative of the overall carbon cycle.
1. The SAB on this point agrees. In its evaluation of the EPA’s 2014 draft accounting framework, the SAB correctly states that “a landscape approach is more appropriate than a stand-level approach. A landscape approach expands the boundaries of analysis to include all effects and recognizes that there is uptake as well as loss of carbon associated with the production of feedstocks concurrently occurring across the landscape. It is the overall balance of losses and gains that determines carbon stock effects.”²⁰

Considerations in U.S. Bioenergy Policy,” 112(6) *Journal of Forestry* 591 at 591 (Nov. 2014) (emphasis added).

¹⁹ SAB Review of EPA’s Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources (September 2011) at 33 (Sept. 28, 2012), available at [https://yosemite.epa.gov/sab/sabproduct.nsf/57B7A4F1987D7F7385257A87007977F6/\\$File/EPA-SAB-12-011-unsigned.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf).

²⁰ SAB review of Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources (2014) at 3 (Mar. 5, 2019), available at

F. While evaluating forest carbon stocks to determine the contribution of wood demand to these stocks, a longer temporal scale is a sound and appropriate approach supported by expert analyses.²¹

1. The longer temporal scale fits with the way in which forests are managed and addressed in the marketplace.

Forests are generally managed on a 25 to 100-year growth cycle (rotation) which reflects the species, the region and the local market.²² Forests are also grown in anticipation of future markets. These principles are all well documented.²³ The material that constitutes “biomass” is both a byproduct and an end product,²⁴ depending on these factors as well as competition from materials such as mill residuals. Generally, the biomass fuel market represents the lowest value for material, so as a harvest is graded for sale, the higher value logs are separated and the lower value material, such as tops, limbs, and unmarketable logs, is sold to the local biomass fuel market, if it exists, or left or burned on site. Whole logs will generally be sold as biomass only where the available market is so constricted that this is the last resort.

2. Unlike the full Board, the SAB’s expert Panel recommended a longer time scale that would allow for all policy related perturbations to be resolved. As Biogenic Carbon Emissions Panel Chair Madhu Khannna, and panel members Robert Abt, Dan Schrag, and Ken Skog stated:

“The Panel’s recommendation . . . is that the BAF calculation time horizon should be ***policy independent and based on science*** to

[https://yosemite.epa.gov/sab/sabproduct.nsf/B86C81BACFAF9735852583B4005B3318/\\$File/EPA-SAB-19-002+.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/B86C81BACFAF9735852583B4005B3318/$File/EPA-SAB-19-002+.pdf).

²¹ For background on the importance of evaluating over a long timescale and broad spatial scale, see, e.g., NAFO, Comments on “Emission Guidelines for Greenhouse Gas Emissions From Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program,” Proposed Rule, 83 Fed. Reg. 44,746 (Aug. 31, 2018) at 4-8, EPA-HQ-OAR-2017-0355.

²² J.P. Siry *et al.* eds., *Forest Plans of North America* (2015).

²³ Karen L. Abt *et al.*, *Effect of policies on pellet production and forests in the U.S. South: A technical document supporting the Forest Service update of the 2010 RPA Assessment*. Gen. Tech. Rep. SRS-202 (2014), Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station (2014); J.S. Baker *et al.*, “Potential Complementarity Between Forest Carbon Sequestration Incentives and Biomass Energy Expansion,” 126 *Energy Policy* 391 (2019); A. Daigneault *et al.*, *Economic Approach to Assess the Forest Carbon Implications of Biomass Energy*, 46 *Environ. Sci. Technol.*, 5664–5671 (2012); Weiwei Wang *et al.*, *Carbon savings with transatlantic trade in pellets: accounting for market-driven effects*, 10 *Environ. Research Letters* 114019 (2015).

²⁴ Marcia Patton-Mallory ed., *Woody biomass utilization strategy*. Forest Service, U.S. Department of Agriculture at 17 (2008).

account for the expected effects on terrestrial carbon stocks (negative and positive) of using a biogenic feedstock. * * * ***Using a 100-year period for comparing global warming potential for all greenhouse gases instead of a shorter policy horizon is the standard international convention adopted by EPA and the Intergovernmental Panel on Climate Change (IPCC). Using a policy-based horizon for BAFs would be a significant departure from the national and international convention for comparing different greenhouse gases.***²⁵

3. The time period over which emissions are assessed is critical for accurate forest carbon accounting due to the long growth cycle of trees and the long-term atmospheric impacts of emissions

III. This proposed forest carbon stocks approach would address concerns about “additionality” raised in the SAB’s reports. Regardless, SAB’s proposal for an anticipated future baseline to address “additionality” is impractical.

Some SAB members suggested EPA should only treat the use of whole trees for energy as carbon neutral if it could be shown that the incremental future increase in demand for bioenergy resulted in equal or greater growth in forest carbon stocks. However, the expressed concern about “additionality” can be addressed fully by the carbon stocks approach, as supported by a range of expert opinions, including:

- Dissent of SAB Panel Member, Roger Sedjo, in 2011. See Appendix E of the SAB’s September 2012 review of EPA’s Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources (September 2011).
- Views of William Hohenstein of the USFS. See Letter from William Hohenstein, Director, Climate Change Program Office, USDA, to Dr. Holly Stallworth, EPA Science Advisory Board (May 25, 2012).
- Studies conducted by U.S. Forest Service economist Karen Abt et al., including “Effect of Bioenergy Demands and Supply Response on Markets, Carbon, and Land Use.”²⁶
- Study by economists, including EPA experts. See J.S. Baker, C.M. Wade, B.L. Sohngen, S. Ohrel, A.A. Fawcett, “Potential Complementarity Between Forest Carbon Sequestration Incentives and Biomass Energy Expansion,” 126 *Energy Policy* 391 (2019).

²⁵ See Letter to Mr. Thomas Carpenter, Designated Federal Officer, EPA Science Advisory Board, from Madhu Khanna *et al.* (Sept. 24, 2018).

²⁶ Karen L Abt *et al.*, “Effect of Bioenergy Demands and Supply Response on Markets, Carbon, and Land Use,” 58(5) *Forest Science* 536 (2012).

- Other research, e.g., Reid A. Miner, Robert C. Abt, Jim L. Bowyer, Marilyn A. Buford, Robert W. Malmshemer, Jay O’Laughlin, Elaine E. Oneil, Roger A. Sedjo, and Kenneth E. Skog, “Forest Carbon Accounting Considerations in U.S. Bioenergy Policy,” 112(6) *Journal of Forestry* 591 (Nov. 2014) (emphasis added).
- A. The carbon stocks approach addresses SAB’s concerns about “additionality” without having to rely on the complex, impractical, and uncertain anticipated future baseline modeling proposed by SAB.
1. There is no need to separately consider “additionality” when forest carbon stocks are stable or increasing
 - a) There is a robust existing market – and experts have found the market will help sustain carbon stocks, because the anticipated demand for wood will contribute to maintaining or growing those stocks. The SAB recognized these facts, but then failed to consider them in its overall analysis.
 - (1) As Dr. Sedjo outlined in his dissent in 2011: “Indeed, while investment decisions must be driven by the anticipation of the existence and size of future markets, these considerations are acknowledged for wood biomass in parts of the Advisory [SAB report] and then ***disregarded in the application of the approach for regulatory purposes***. Thus, the actual approach suggested is essentially static, ***missing the essential dynamic nature of the supply process***.”²⁷ Dr. Sedjo concluded that “***biogenic greenhouse gas emission are best not considered in determining thresholds*** or perhaps considered only ... [if] the forest and land use conditions ... [are] such that they do not meet minimal IPCC conditions.”²⁸
 - b) This notion of “anticipatory planting” is essential to understanding the carbon stocks approach. The commercial forest market is managed in a way that anticipates future demand. Hence, using biomass as a commercial fuel source does not create an economic market or carbon forest cycle failure necessitating a regulatory response.

²⁷ SAB Review of EPA’s Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources (Sept. 2011) (Sept. 28, 2012), Appendix E (Dissenting Opinion from Dr. Roger Sedjo), [https://yosemite.epa.gov/sab/sabproduct.nsf/57B7A4F1987D7F7385257A87007977F6/\\$File/EPA-SAB-12-011-unsigned.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf). (emphasis added).

²⁸ *Id.* at E-5 (emphasis added).

(1) Dr. Sedjo also addressed the importance of “anticipatory planting” – and the fact that the previous EPA accounting framework had not considered that effect – in a presentation at an October 25, 2011 meeting of the SAB’s Biogenic Carbon Emissions Panel.

“While the EPA Accounting Frame Work captures carbon releases due to biomass energy, it does not account for forest management and forest expanding investments that expand forest carbon in response to anticipated demand increases for biomass for energy.”²⁹ This finding “is consistent with the IPCC treatment, which treats net carbon emissions from the wood energy as zero. Any net carbon changes are monitored via changes in forest stocks.”³⁰ He concluded that “the commercial forest stock will increase if a larger wood biomass demand is anticipated.”³¹

“These results are system wide and occur not only for an individual forest but also for an **interconnect[ed] forest system** where the various managers react to common market forces.”³²

(2) USFS experts agree. In a study entitled, “Effect of Bioenergy Demands and Supply Response of Markets, Carbon, and Land Use,” U.S. Forest Service economist Karen Abt and her co-authors demonstrate that “[h]igher product prices [due to new bioenergy-related wood demand] are linked to land use through the planting response function such that ***an increase in prices will lead to an increase in new pine plantations***. Thus, in scenarios in which prices increase, there is more timberland area than occurs under the baseline scenario without bioenergy demand. ***This, in turn, leads to a higher level of carbon sequestration in the standing forest than occurs under the baseline***.”³³

Likewise, a Journal of Forestry article, “Forest Carbon Accounting Considerations in U.S. Bioenergy Policy,”

²⁹ Roger A Sedjo, “Evaluation of Methodological Issues in the EPA ‘Accounting Framework for Biogenic Carbon Dioxide Emissions’ Study” (Oct. 25, 2011) (See Conclusions) (emphasis added).

³⁰ *Id.* (emphasis added).

³¹ *Id.* (emphasis added).

³² *Id.* (emphasis in original).

³³ Karen L. Abt *et al.* “Effect of Bioenergy Demands and Supply Response on Markets, Carbon, and Land Use,” 58(5) *Forest Science* 536 (2012) (emphasis added).

which included U.S. Forest Service co-authors, notes that ***“Increased demand for wood can trigger investments that increase forest area and forest productivity and reduce carbon impacts associated with increased harvesting.”***³⁴

(3) Studies co-authored by EPA’s own staff would also appear to concur. A study that was co-authored by EPA economists Sara Ohrel and Allen Fawcett concluded that, “Bioenergy demand growth increases forest sector investment and economic rents in the near-term to ensure adequate long-term feedstock supply.”³⁵

c) The SAB’s concern with carbon debts incorrectly focuses on the harvest, as opposed to the overall carbon cycle that begins upon planting.

(1) As Dr. Roger Sedjo explained, forest carbon accounting protocols are highly dependent on temporal assumptions. “If the accounting focuses on a stand and the accounting period begins with the harvest, a debt will be establishment for the forest stand. However, if the accounting begins with the forest establishment, e.g., at tree planting, then the initial post planting growth is building up a stock of carbon that will be released at harvest. ***Thus, any future debt from that stand will have been offset in advance of the harvest and no intertemporal net carbon debt is incurred.***”³⁶

(2) The carbon stocks approach avoids the need for complex carbon debt models, even at the landscape scale, by using data that reflects the actual operation of the carbon cycle across the national landscape.

B. Regardless, the SAB’s reference to “anticipated baselines” is impractical for present regulatory purposes and unduly complex.

1. Anticipated baselines are extremely complex to model and lack

³⁴ Reid A. Miner, Robert C. Abt, Jim L. Bowyer, Marilyn A. Buford, Robert W. Malmshiemer, Jay O’Laughlin, Elaine E. Oneil, Roger A. Sedjo, and Kenneth E. Skog, “Forest Carbon Accounting Considerations in U.S. Bioenergy Policy,” 112(6) *Journal of Forestry* at 591 (Nov. 2014) (emphasis added).

³⁵ J.S. Baker *et al.*, “Potential Complementarity Between Forest Carbon Sequestration Incentives and Biomass Energy Expansion,” 126 *Energy Policy* 391 (2019) (emphasis added).

³⁶ SAB Review of EPA’s Accounting Framework for Biogenic CO₂ Emissions from Stationary Sources (Sept. 2011) (Sept. 28, 2012), Appendix E (Dissenting Opinion from Dr. Roger Sedjo) at E-3 (emphasis added).

practicability, accuracy and predictability compared with a simpler reference point baseline approach.

2. This is confirmed by a 2014 study by Buchholz et al., entitled, “Uncertainty in Projecting GHG Emissions from Bioenergy.”³⁷ It found that: “never in 30 years of timber trend assessments have the near-term anticipated future projections of surplus roundwood been as accurate as the constant reference would have been.” The study concludes that “given the challenges in predicting the future status of forest resources, . . . constant reference baselines might be more appropriate for monitoring and regulatory frameworks.”

IV. Separate from the questions related to forest carbon stocks, biomass residuals and biowastes are carbon neutral.

- A. Regardless of the state of forest carbon stocks, residuals and biowastes are carbon neutral, and in some cases even can produce a large GHG reduction benefit from being used for energy. As EPA has noted, the use of residuals and biowastes for energy reduces “anyway emissions” -- because it avoids GHG emissions from the alternative fate of disposal. Disposal can produce methane, which is a climate-forcing agent 25 times more potent than CO₂.
- B. In its review of the 2011 Draft Framework, the SAB recommended that an alternative fate approach be used to assess the potential emissions profile of residuals and waste-derived feedstocks if not used for bioenergy, including methane emissions.
- C. The 2014 draft of EPA’s Framework included various alternative fate analyses, including several scenarios relating to black liquor in Appendix N.³⁸ EPA’s assessment found that the combustion of black liquor to generate energy could be beyond carbon neutral.³⁹

³⁷ Thomas Buchholz et al., “Uncertainty in Projecting GHG Emissions from Bioenergy,” *Nature Climate Change* (Nov. 26, 2014) (emphasis added), available at <http://www.nature.com/articles/nclimate2418>.

³⁸ EPA, Draft Framework for Assessing Biogenic CO₂ Emissions From Stationary Sources, Appendix D: Assessing Biogenic CO₂ Emissions from Waste-Derived Feedstocks, at pp. D-29-31 (2014), available at [https://yosemite.epa.gov/sab/sabproduct.nsf/0/3235DAC747C16FE985257DA90053F252/\\$File/Framework-for-Assessing-Biogenic-CO2-Emissions+\(Nov+2014\).pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/0/3235DAC747C16FE985257DA90053F252/$File/Framework-for-Assessing-Biogenic-CO2-Emissions+(Nov+2014).pdf).

³⁹ *Id.*

- D. Other research, particularly a study by the National Council for Air and Stream Improvement (NCASI) shows substantial greenhouse gas reduction benefits from using manufacturing residuals for biomass energy in the forest products industry. The NCASI study, "Greenhouse Gas and Fossil Fuel Reduction Benefits of Using Biomass Manufacturing Residuals for Energy Production in Forest Products Facilities" (rev. Aug. 2014), examined the life cycle greenhouse gas and fossil fuel reduction benefits of using biomass residuals for energy production in the U.S. forest products industry. Wood processing activities at pulp, paper and wood products mills produce a large volume of biomass residuals integral and incidental to the manufacturing process, and those forest products manufacturing residuals are the primary source of energy to run the mills. On average, about two-thirds of the energy powering forest products mills is derived from biomass. The NCASI study finds:
1. There are substantial greenhouse gas reduction benefits in using biomass manufacturing residuals for energy in the forest products industry. Accounting for fossil fuel displacement and avoided emissions associated with disposal, the use of biomass residuals each year avoids the emission of approximately 181 million metric tons of CO₂e. (This has been estimated to be equivalent to removing approximately 35 million cars from the road.)
 2. The benefits of using biomass residuals for energy have been rapidly realized:
 - a) The greenhouse gas reduction benefits are realized in 1.2 years or less.
 - b) Even if the benefits of displacing fossil fuels are ignored, the use of manufacturing residuals for energy produces lower cumulative greenhouse gases emissions in 0 to 19.5 years, depending on the type of residual, with a weighted average break-even time of 7.6 years.
 - c) When considering its ongoing production and use of biomass energy over many years, the U.S. forest products industry is producing net greenhouse gas benefits by using biomass as its major energy source.
 - d) If the U.S. forest products industry did not use biomass residuals and relied solely on fossil fuels for energy, the ultimate direct releases of greenhouse gases approximately would quadruple.

V. Conclusion

- A. EPA has substantial discretion to use its de minimis authority to adopt a policy that excludes from PSD permitting biogenic CO₂ emitted when biomass is used as a fuel or feedstock, given that carbon stocks are stable or increasing. EPA is not required to incorporate any recommendations made by SAB or one of its subcommittees.
- B. EPA can monitor U.S. forest carbon stocks using FIA data. If the data were ever to suggest that U.S. forest carbon stocks are no longer stable or increasing, EPA would need to determine whether using forest biomass as an energy source is causing or contributing to the conversion of forests to non-forest use. If so, EPA could then revisit the regulatory treatment of CO₂ emitted from the use of biomass as fuel.
- C. EPA is now operating under clear direction from the Congress and a very different policy framework vis-à-vis biogenic emissions than when it drafted its proposed accounting framework in 2011 and 2014. Also, when EPA asked SAB to review its BAF in the context of the draft accounting framework reports, EPA limited the request to the scientific and technical advice; SAB cannot provide legal or policy guidance.
- D. SAB reviewed EPA's 2014 draft approach without a specific policy framework. But, EPA's regulatory work on PSD provides a very specific policy framework, further distinguishing the technical review SAB provided from the regulatory work EPA is now undertaking.
- E. There is ample evidence to justify treating forest-derived biomass as carbon neutral given that U.S. forest carbon stocks are stable or increasing and in light of the expert views outlined above regarding the appropriateness of the carbon stocks approach, the expected investment response from the robust U.S. market, the soundness of considering broad temporal and spatial scales, and the impracticality of complex modeling approaches for regulatory purposes. Indeed, for regulatory purposes, the monitoring of forest carbon stocks using FIA data is clearly more practical, accurate and predictable than complex modeling.
- F. Basing the future of an important part of the U.S. bio-economy on highly impractical and uncertain modeling, such as the construction of a future anticipated baseline, would create enormous regulatory uncertainty and likely would generate false predictions and be counterproductive.
- G. In the U.S., there is no market failure that justifies regulating forest-derived biogenic CO₂ emissions from stationary sources under the Clean Air Act.

- H. Regardless of the state of forest carbon stocks, there is no regulatory benefit to regulating biomass residuals and biowastes since their alternative fates (e.g., landfilling or incineration without energy recovery) can produce as much or more GHG emissions than combustion for energy.
- I. Not only would the regulation of biogenic CO₂ in the PSD program have de minimis regulatory benefit, but regulation would impose unwarranted regulatory uncertainty, costs and negative reputational impacts that would act as a drag on the development of the U.S. bio-economy.
- J. The treatment of forest-derived fuels and feedstocks used at stationary sources as carbon neutral is consistent with the twin purposes of the Clean Air Act to promote public health and welfare and the productive capacity of the nation.⁴⁰

⁴⁰ Clean Air Act, Section 101(b), 42 U.S.C. § 7401(b).